

**iGEM TU/e 2014**

Biomedical Engineering

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**Date**

4 August 2014

## Protocol oil and water phase for bead encapsulation

This is a protocol for the production of the oil and water phase used in the microfluidic droplet device. It has been composed with the use of scientific resources and improved by trial and error during the experiments.

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## 1 Oil Phase

- Fluorosurfactant 3.0% m/m in HFE-7500. This equals 4.1% v/v in HFE-7500.
- For 5 mL oil phase:
  - First add 4795  $\mu\text{L}$  HFE-7500 to a 15 mL falcon tube.
  - Finally add 205  $\mu\text{L}$  fluorosurfactant.

## 2 Continuous phase

- For the first water phase a total volume of 1 mL is used:
  - First add 800  $\mu\text{L}$  of demineralized water.
  - Then 200  $\mu\text{L}$  of the stock bead solution ( $=1.3 \times 10^8$  beads/mL).
- For the second water phase a total volume of 2 mL is used:
  - Add 2000  $\mu\text{L}$  of demineralized water to a falcon tube.

## 3 Density matching

- To match the density OptiPrep<sup>TM</sup> is used. The amount of OptiPrep<sup>TM</sup> that needs to be added can be calculated as follows:

$D = \frac{Vd + V1 d1}{V + V1}$  with D = density of mixture; V = volume of OptiPrep<sup>TM</sup>; d = density of OptiPrep<sup>TM</sup>; V1 = volume of diluent; d1 = density of diluent.

**(NOTE: The beads have a density of 1.05 g/mL).**

- Calculate the amount of OptiPrep<sup>TM</sup> needed for both phases.

## 4 References

Mazutis, Linas, John Gilbert, W Lloyd Ung, David A Weitz, Andrew D Griffiths, and John A Heyman. "Single-cell analysis and sorting using droplet-based microfluidics." *Nature protocols* 8.5 (2013): 870-891. Print.  
OptiPrep<sup>TM</sup> Preparation of gradient solutions. Biological Separations. ISSUE 2, 2009.